Weatherfax on the cheap.

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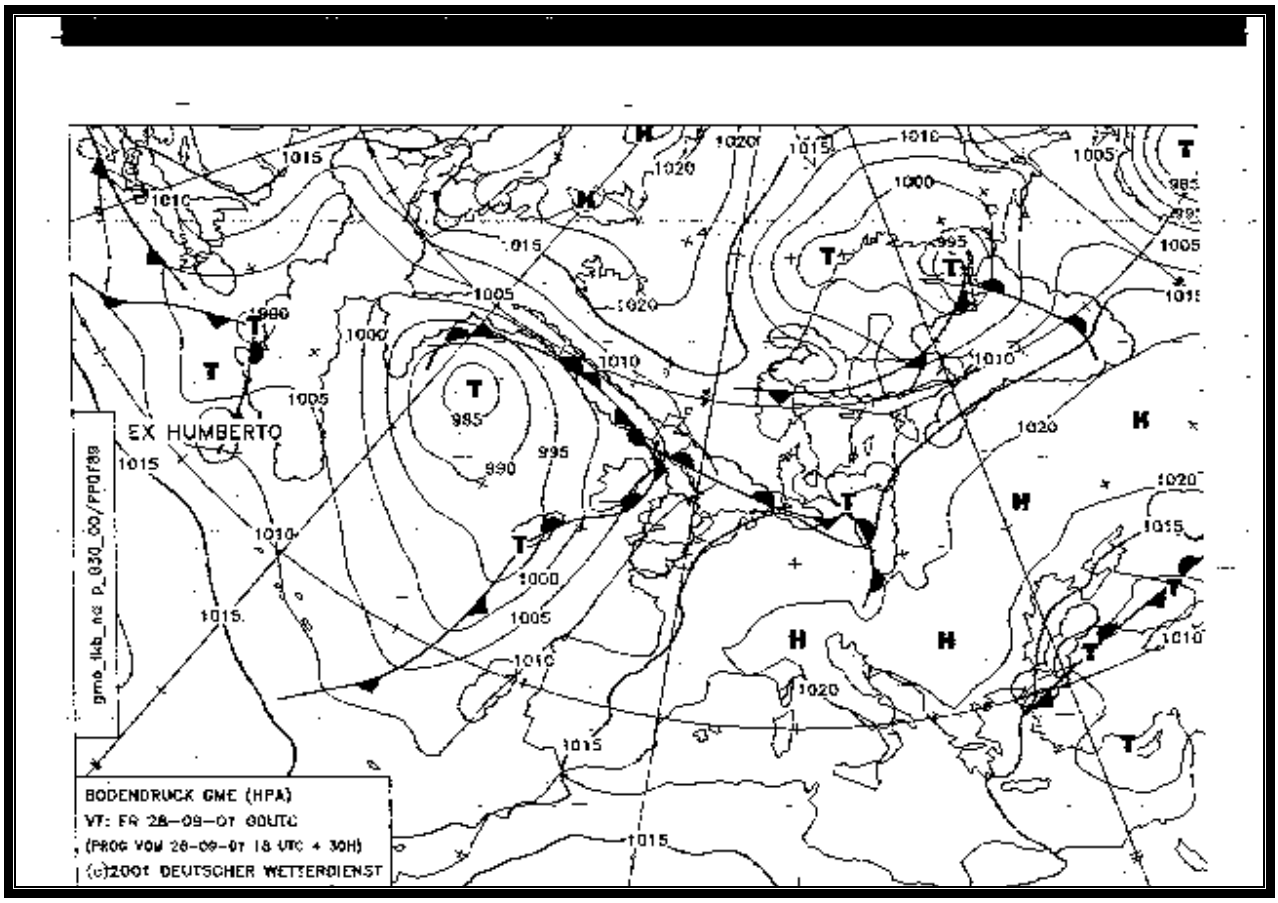

A guide to receiving weatherfaxes on a cruising yacht at low cost and with minimum power consumption.

While this document deals with using a Hewlett Packard 200LX palmtop computer with the HFFAX 5.1a software, much of the information it contains should prove useful to users of other hardware and software.

All the weatherfaxes and screendumps in the article come from the HPLX. The article was written and edited on my Ericsson MC218 palmtop (a Psion Series 5mx in drag). The author of this document, Owen H. Morgan can be reached through his yachting web site at:

http://pagina.de/naomi.j

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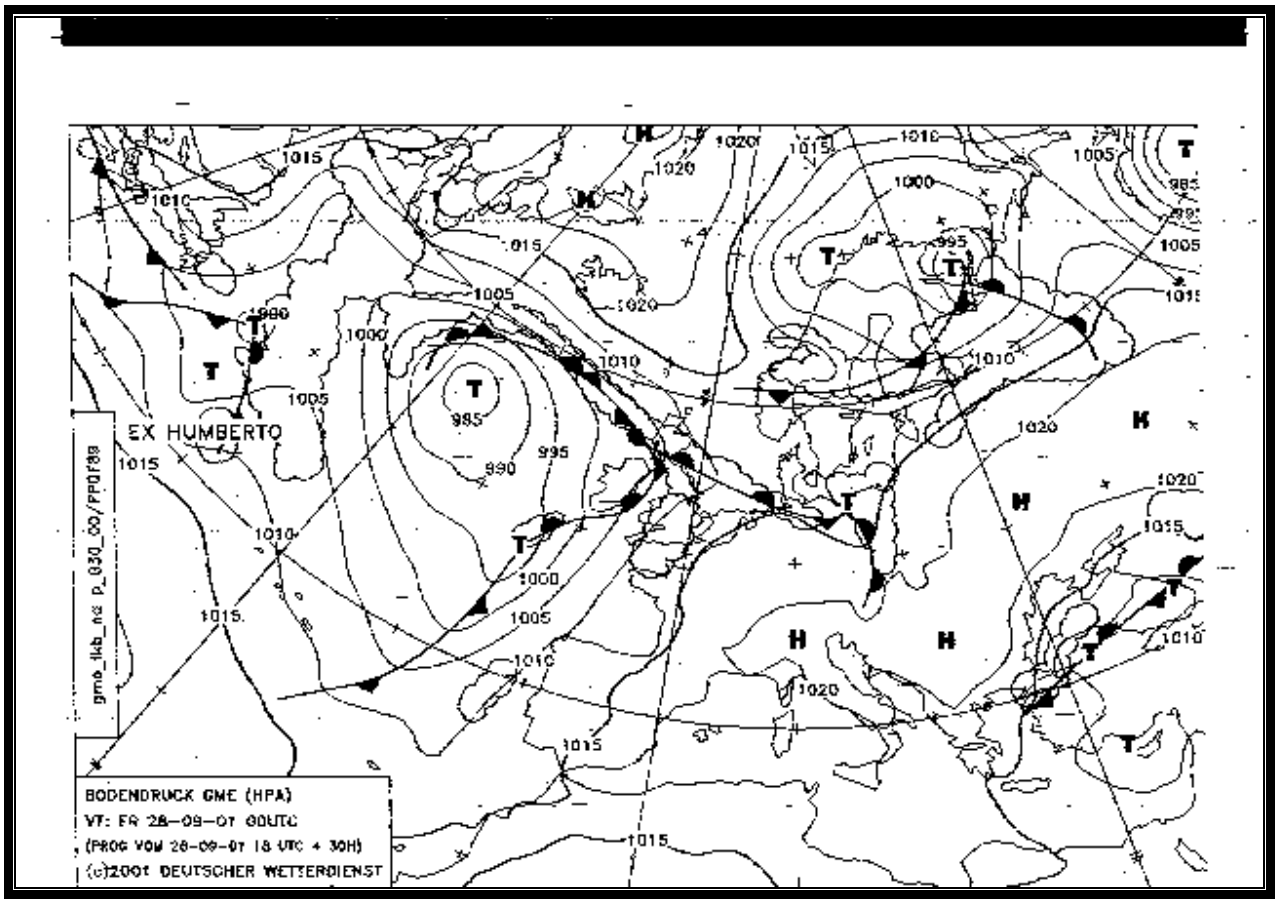
WHAT IS WEATHERFAX?

Weatherfaxes are isobar charts and other weather information transmitted by short-wave radio. Weatherfax transmissions are one way, just like broadcast radio, and once you have the equipment to receive them there is no cost. This is at present the only way to receive detailed weather charts on the high seas for free, and it is very useful both for commercial shipping and yachts on passage. A sample weatherfax is shown below.



A 30 hour forecast received in northern Norway from Hamburg on 13882.5 kHz.

How it's done

Even though the printed weatherfaxes look very much like a fax from an office fax machine, the technology to scan, transmit and receive them is very different. The faxes are transmitted as an analogue radio signal on short-wave radio. The scanner at the transmitting station scans the image one line at a time. When it encounters black, the transmitting frequency is shifted down by 425 Hz.

Unlike phone line faxes, there are no pixels in the horizontal plane, just a continuous carrier wave shifted down by 425 Hz every time the scanner encounters black. It is also possible to transmit greyscale images by the same technology by varying the frequency shift, but weather facsimile transmissions are generally black and white.

An old-fashioned dedicated weatherfax receiver has a pen carriage which travels horizontally across the paper and prints the incoming image by lowering the pen every time the frequency is shifted down by 425 Hz. The paper is advanced by the same number of lines per minute as the transmitter is sending the image. A PC receiving weatherfaxes has to convert this analogue signal to pixels. HFFAX on the 200LX uses a resolution of 640 pixels horizontally, as this happens to be the width of the CGA screen.

HARDWARE

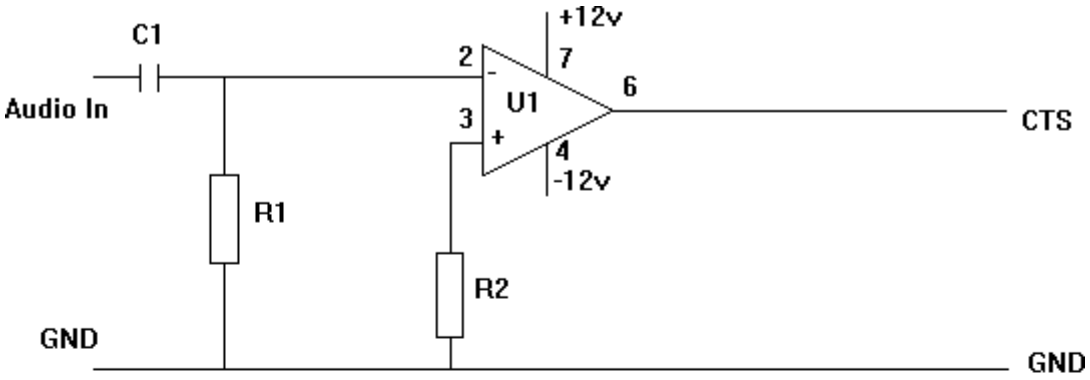
I use a single speed Hewlett Packard HP200LX palmtop computer with a NASA Target HF3/M short-wave receiver and a NASA active HF antenna. I have found that 4 Mb of free disk space is the minimum requirement to make it useful with automatic reception, so I have installed an 8 Mb CF (compact flash) disk which gives me room for the software plus approximately 40 faxes. With my present schedule I receive 17 weatherfaxes per day, so this means I have to delete old faxes at least every other day. A bigger disk would give more elbow-room.

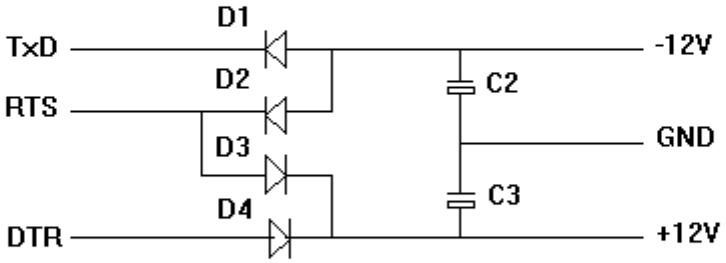
The HP200LX with the 8 Mb CF disk and a PCMCIA to CF adapter.

The NASA Target HF3/M short-wave receiver.

My NASA short-wave receiver has a built in OP-amp interface for weatherfax and radio teletype (RTTY) reception. If you have a different receiver, you'll probably need an external interface, generally known as a HamCom modem. If you did not get one with your copy of HFFAX, it is simple to make from the drawing below with a few easily obtained components, or you can buy one from suppliers of amateur radio equipment.

Drawing and component list for a HamCom modem.





Parts List:		COM Port:	25way	9way
U1	741	CTS	5	8
R1	100K	GND	7	5
R2	10K	TxD	2	3
		RTS	4	7
C1	0.1uF	DTR	20	4
C2-3	10uF, 16v	DSR	6	6
D1-4	1N4148 or 1N914			

Short-wave receivers

There are several short-wave receivers on the market capable of receiving weatherfax. You need a good quality short-wave receiver, preferably with an SSB (USB/LSB) setting, a clarifier button and at least 1 kHz resolution tuning. Some radios without an USB / LSB button, but with a BFO may also work.

Here are some examples

- **NASA Target Communications Receiver HF3/M ***
- **Sangean ATS909**
- **Sony ICF 7600 G**
- **Lowe HF 150**
- **Grundig Satellit 700**

** NASA make the Target receiver in three different flavours, the HF3, HF3/P and HF/3M. Only the HF3/M has a built-in HamCom interface and this is the model that is best suited to the HP200LX palmtop and HFFAX software. The TarFax software that comes with this receiver will not run on the HP. The HF3/P has a line out signal for software that uses a sound card for weatherfax reception and comes with Windows software. The HF3 has no connections for external equipment.*

An even better, but more expensive option would be a good quality amateur radio receiver like those made by Yaesu, Icom, JRC and others. You can also use a marine HF transceiver or an amateur radio short-wave transceiver with coverage on the appropriate frequencies.

SOFTWARE

After I found out that the TarFax software which came with my NASA Target receiver does not work with the HP palmtop, I turned to the HPLX-L mailing list for help, and received a copy of HFFAX 3.0 from a list member. I have since obtained other versions of HFFAX for DOS from various sources and tested them on the Palmtop. I am now using HFFAX 5.1a.

How the software works

Since computers think in bits and bytes rather than analogue, computer software decodes a weatherfax by sampling the signal a fixed number of times per line. The short-wave receiver is set to USB mode and tuned to the transmitting station so that the base signal is audible as a tone around 1750 Hz. The sampling is done via a simple OP-amp interface that converts the audio signal to voltages that are read by the DSR or CTS pin on the RS-232 interface of the computer. Some Windows and Mac software use the line-in port of the sound card.
In the HFFAX software, the signal is sampled 640 times per line in low resolution mode and 1280 times per line in high resolution. This is a choice made by the programmer, and has nothing to do with the transmitted signal which is analogue and is not mapped to pixels in the horizontal plane. The value 640 was probably chosen by the programmer simply because it matches the horizontal resolution of a CGA or VGA computer screen and when faster computers with bigger screens came along, the easiest solution was to double the resolution.
In order to receive in high resolution, the HFFAX software needs an SVGA graphics card and 1Mb of EMS, so only low resolution reception is possible on the HPLX. Still, while the received image is slightly coarse, it does provide lots of useful information and I have come to the conclusion that the better resolution is not worth the hassle of using an expensive and power-hungry Windows or Mac notebook computer. In fact, the only weatherfaxes that aren't really readable in low resolution are the schedules, but as they don't change much, it's enough to download the schedule from the Internet before a cruise.
The author of HFFAX is "Software Systems Consulting" who have a web site at http://www.ssccorp.com. However, there is no mention of the DOS version of their software at the site and apparently, they no longer support it. I did try to approach them about making the DOS version available to palmtop users, but unfortunately they were not interested.
I have tested several versions of HFFAX for DOS, and found that the one that works best on the HP palmtop is 5.1a. This is the only version that does not cut some of the longer faxes off before the end. Version 6.0 and above lock the keyboard, so cannot be used on the HP200LX.

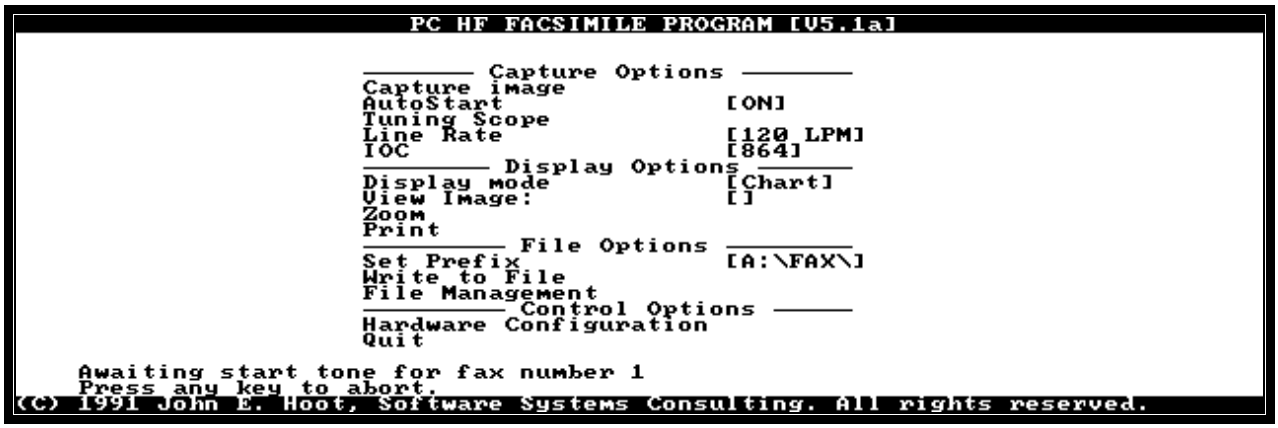
Software settings

The settings I use in HFFAX 5.1a for reception from the Hamburg, Offenbach transmitter are:

Main menu

- **Line Rate: 120 LPM**
- **IOC: 864 ***
- **Display mode: Chart**
- **Set Prefix: A:\FAX**

** According to Offenbach's web site, the IOC is 576. However, when I set it to 576, my faxes are elongated in scale and some of the longer faxes are cut off before the end. When I set IOC to 864, the faxes are square in scale and all the faxes come through complete. In HFFAX 3.0, a setting of 576 produces faxes that are square in scale, but some of the longer faxes are cut short.*



The main menu in HFFAX 5.1a waiting for a weatherfax in auto mode.

Hardware configuration menu

- **Clocks per Pixel: 1864**
- **Timing Correction: 290**
- **White Frequency: 1700**
- **Black Frequency: 1300**
- **Graphic Card Type: CGA**
- **Video Display Type: Backlit LCD**
- **Demodulator Port: COM1**
- **Interrupt Number: 4**
- **Real Time Clock: PRESENT**

The hardware configuration menu in HFFAX 5.1a

RECEIVING YOUR FIRST WEATHERFAX

For initial tuning, it is best to chose a time between the scheduled weatherfaxes as I have found it easier to tune to a clear carrier wave the first time. Note that transmission times are up to 20 minutes, so between scheduled faxes means at least 15 - 20 minutes after a scheduled time. However, some transmitters are switched off between faxes, so you'll have to make the best of what you get.

1. Schedules and frequencies

If you're in Europe, download the Hamburg / Offenbach schedule from:
http://www.dwd.de/services/gfsf/e_faxpln.html

If you're In the USA, Go to the following page and look at the schedule and frequencies at the bottom:
http://www.nws.noaa.gov/om/marine/radiofax.htm

This site also contains lots of useful information on weatherfax and links to several other useful sites, including an online "Radiofacsimile Charts Users Guide"
Note that all times given in the schedules are in UTC. Since I don't use my HPLX palmtop for anything else, I have set its internal clock to UTC time to keep things simple.

2. Connecting the computer to the receiver

If you are using the NASA receiver and a HPLX palmtop, you will need a nullmodem adapter between the HamCom modem or NASA receiver and the RS-232 cable that comes with the HP. If you're making your own cable, connect the signal from the receiver to pin four on the 9 pin D female plug of the HP RS-232 cable and ground to pin five. If you're using the NASA receiver with a notebook or desktop computer, simply connect the receiver to the computer with the supplied cable. If you are using a different receiver, connect the HamCom interface to the data port or external speaker port of the receiver and to the RS-232 interface on your computer.

3. Tuning the receiver

Switch on your short-wave receiver, set the mode selector to USB or to BFO if you don't have an USB/LSB switch, and tune to the frequency listed for the transmitter you are using. If you are using the NASA receiver, you should tune to the exact frequency, with some other receivers, you may need to tune 1.9 kHz below the listed frequency.

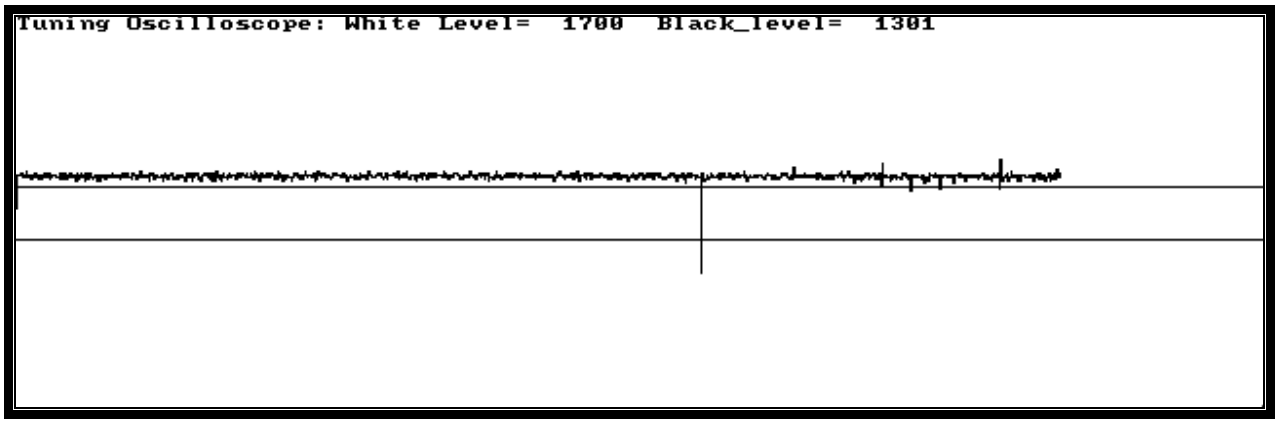
4. Fine tuning

If you have connected the HamCom modem to the external speaker port of your receiver and this disables the internal speaker, you need to temporarily unplug the cable from the receiver for this step. Slowly turn the clarifier or BFO control of the receiver until you hear a clear high-pitched note. If you have access to a musical instrument, the note should be around E2. When tuned to the Hamburg Offenbach transmitter, the correct setting on my NASA receiver is with the clarifier set to "ten o'clock" for 7880 kHz. For 13882.5 kHz, I set the frequency dial to 13883 kHz and the clarifier around 11:30. If you cannot find a signal, try a different frequency or a different time of day. Note that some weatherfax stations turn the transmitter off outside scheduled times.

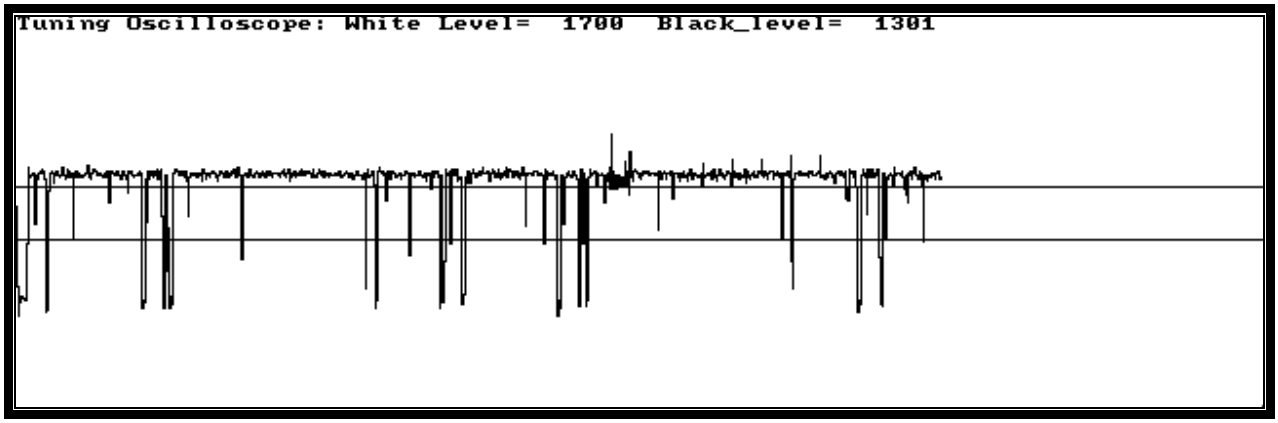
5. Using the tuning scope in the software

Reconnect the data cable to the short-wave receiver if you disconnected it in the previous step. Chose "Tuning scope" from the menu in HFFAX. If you have configured the software correctly, you should get a display with the text "Tuning Oscilloscope: White Level = 1700 Black Level = 1300" and two horizontal lines. If the computer is

correctly connected to the receiver, there will be a slightly squiggly line being continually refreshed across the screen from left to right. Gently tune the clarifier control of the receiver until this line is just above the uppermost horizontal line.



The tuning scope screen in HFFAX receiving a clear carrier wave.

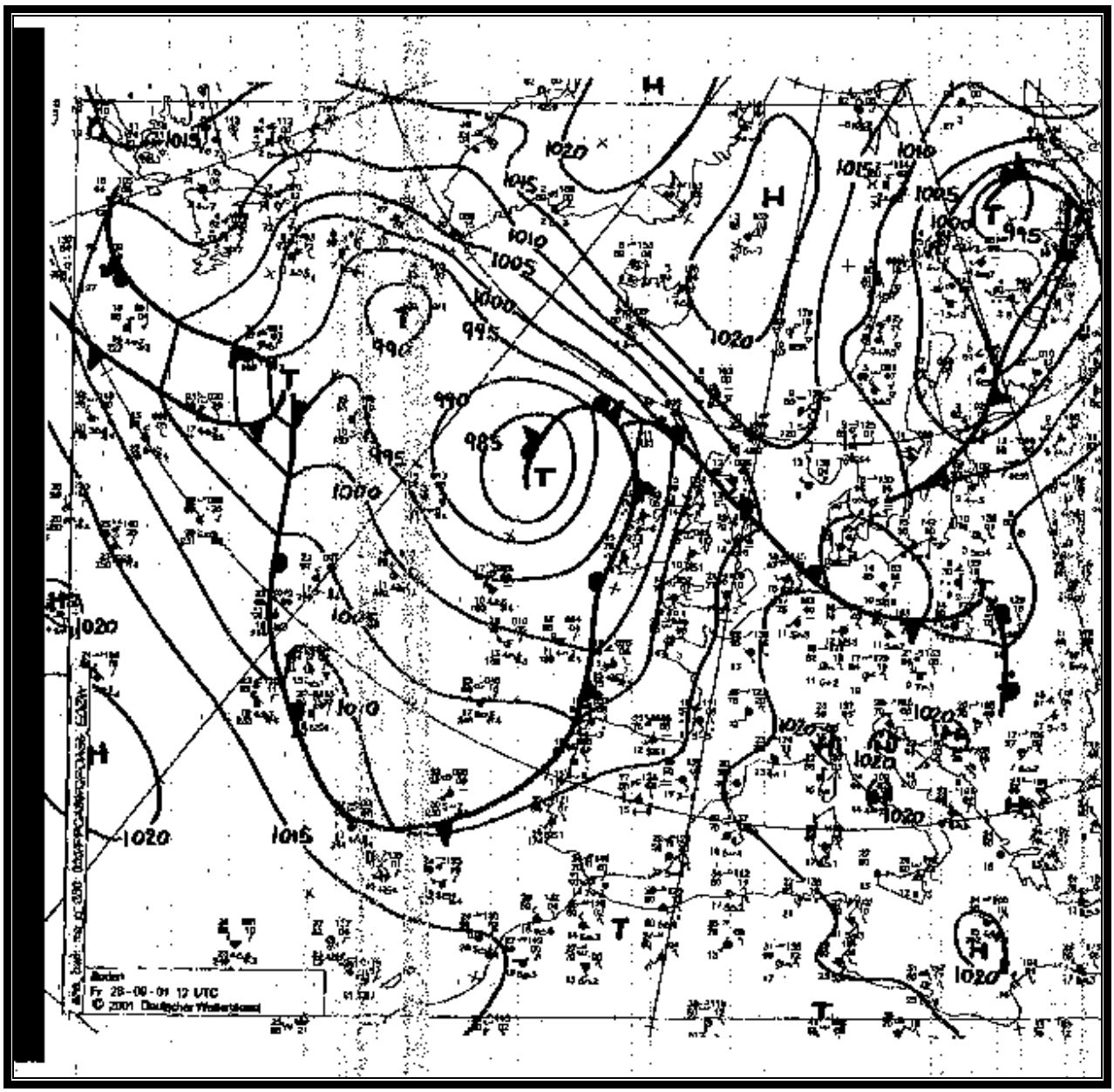


The tuning scope screen in HFFAX receiving a weatherfax signal.

6. Manually receiving a weatherfax

Watch the tuning scope or listen to the short-wave receiver at the scheduled time for a fax transmission. The 1750 kHz note should change to a loud buzz followed by a low note with short high-pitched pulses. This indicates the start of a weatherfax. Press <esc> to exit the tuning scope and chose "Capture image". You will be presented with a blank screen, and should see your incoming weatherfax being slowly drawn on screen, one line at a time.
The reception will take between 10 and 20 minutes and in HFFAX 5.1a the incoming image will look foreshortened, but if your settings are correct, it will look all right when you view it later. Don't worry if the fax is shifted to the left or right. This can be adjusted from the viewing screen later. If the fax is slanted to the left or right, you need to adjust the value for Timing Correction and possibly also Clocks per Pixel on the "Hardware Configuration" screen as described below.

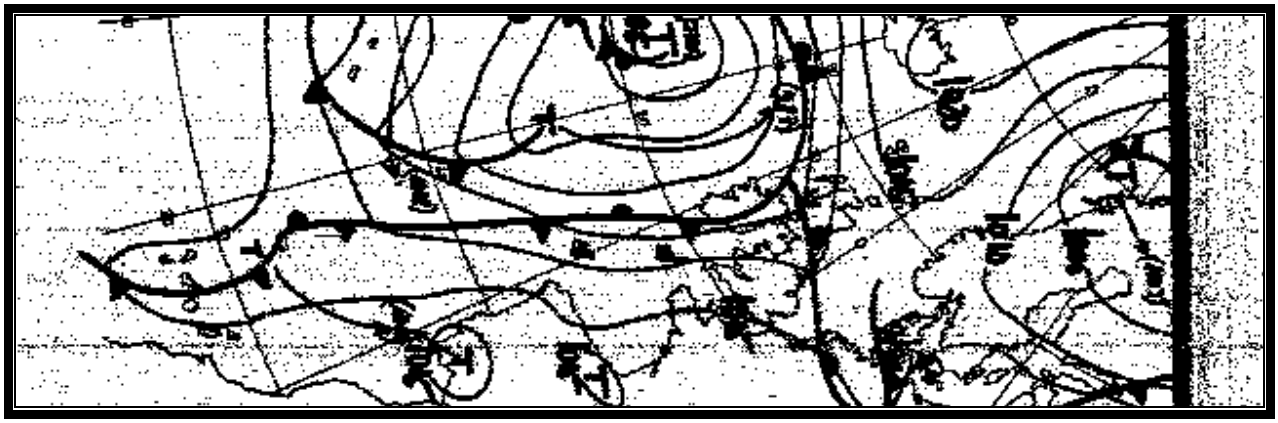
This is how the fax shown below looks on the capture screen in HFFAX while it is being received.



The weatherfax received above as it looks when turned the right way around. As you can see, the signal was a bit noisy.

7. Viewing the received weatherfax

When the reception is complete, press <esc> to exit the capture screen and "V" to view the fax. If it is not centred on the page, you can move it with the arrow keys. You can also move it up and down with the arrow or page up and page down keys.



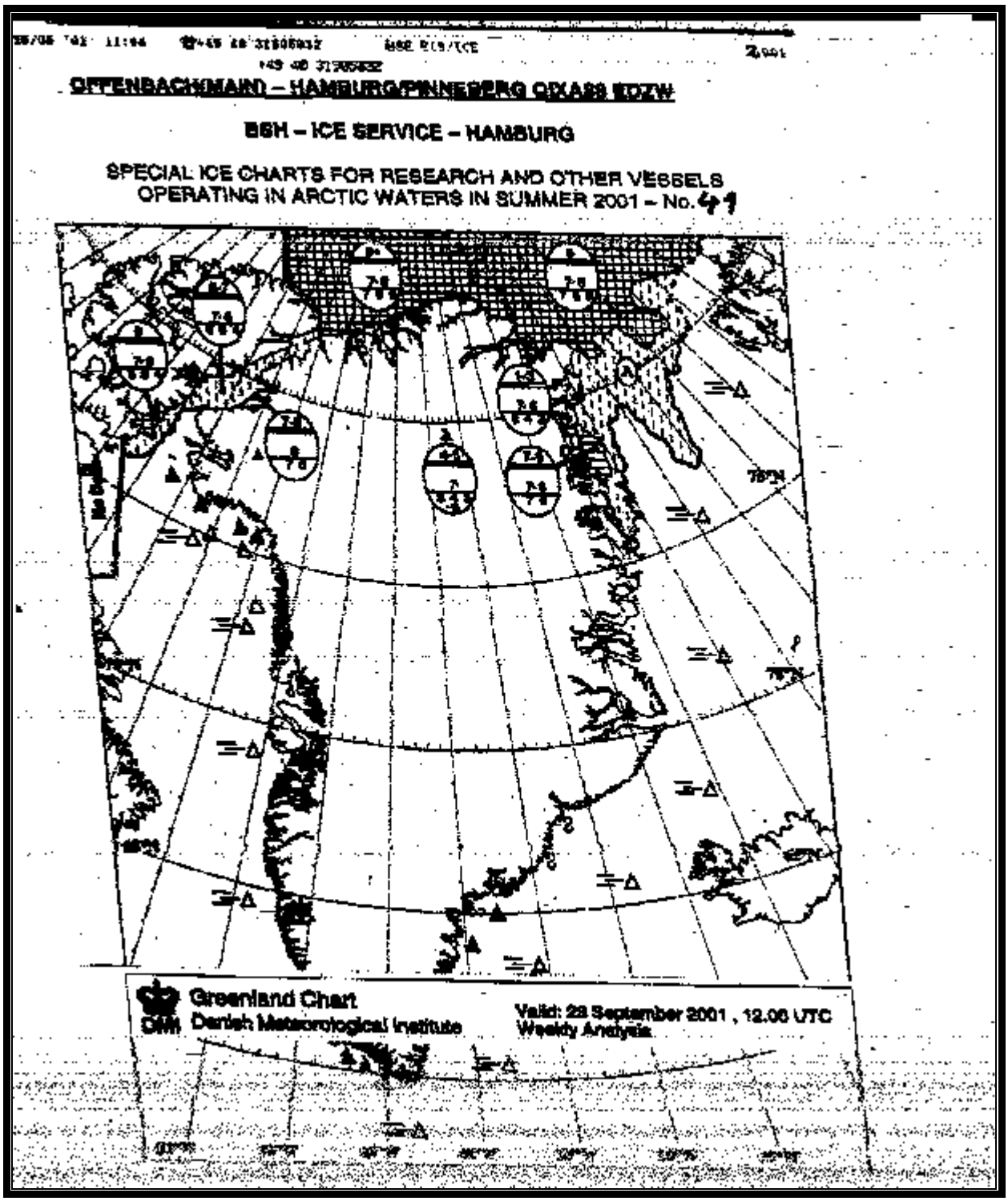
Viewing a received weatherfax. The Surface Pressure Analysis charts from Offenbach are transmitted sideways. You can move the image up, down, left and right with the arrow and PgUp PgDn keys.

8. Saving to disk

When you are finished looking at the image, you can press <esc> to exit to the main menu and "W" to save the fax to disk. You will be prompted for a filename.

FINDING THE CORRECT TIMING CORRECTION

If running HFFAX on different hardware from my single speed HP200LX palmtop, it will probably be necessary to change the Timing Correction settings on the hardware configuration menu. If your faxes come through slanted to one side or the other, this is an indication that these settings are wrong. However, if the top and bottom of the fax is also slanted, it simply means that the operator was sloppy when he put the sheet in the scanner.


OFFENBACH/MAIN – HAMBURG/PINNEBERG
BSH – ICE SERVICE – HAMBURG
SPECIAL ICE CHARTS FOR RESEARCH AND OTHER VESSELS
OPERATING IN ARCTIC WATERS IN SUMMER 2001 – No. 41
Greenland Chart
Danish Meteorological Institute
Valid: 28 September 2001 , 12.00 UTC
Weekly Analysis

A weatherfax received with incorrect timing correction. This fax was received with the timing correction set to 220. The correct value for this computer is 290.

Try changing the Timing Correction first. The Range is from 0 to 600 in steps of 60. Start reception with 300. If your picture is shifted to the left (vertical lines go from left to right when receiving) your timing correction is too low. Go up in steps of 60. If you reach 600, you have to increase Clocks per Pixel, but only by one. The relationship between Clocks per Pixel and Timing Correction is 1:600. If your picture is slanted to the right, go down with the Timing Correction in steps of 60 like described above. Remember that Changing Clocks Per Pixel by one corresponds to changing the Timing Correction by 600!
An easy way of finding the correct timing correction setting is to use one of the short-wave time stations. Set your weatherfax program to 60 LPM and tune your receiver to the time station using USB. When the timing correction is right, the signal will be received as vertical lines on the capture screen.
There is a list of time transmitters at:
http://www.heret.de/funkuhr/liste.htm

AUTOMATIC RECEPTION

Once you have manual reception working, you will probably want to try automatic reception. On the Autostart screen, you can set when to start reception, how many faxes to receive and the first six characters of the filename you want the faxes to be saved under. The next two characters are a two digit number which is automatically assigned by the software. You can replace the date, time or number of faxes with an asterisk "*" wildcard. Setting the date to "*", the time to 04:25 and the number of faxes to 20 would start reception at 04:25 every day and collect the next 20 faxes. Putting an asterisk in all three fields would simply collect everything that comes along until you press <esc>.

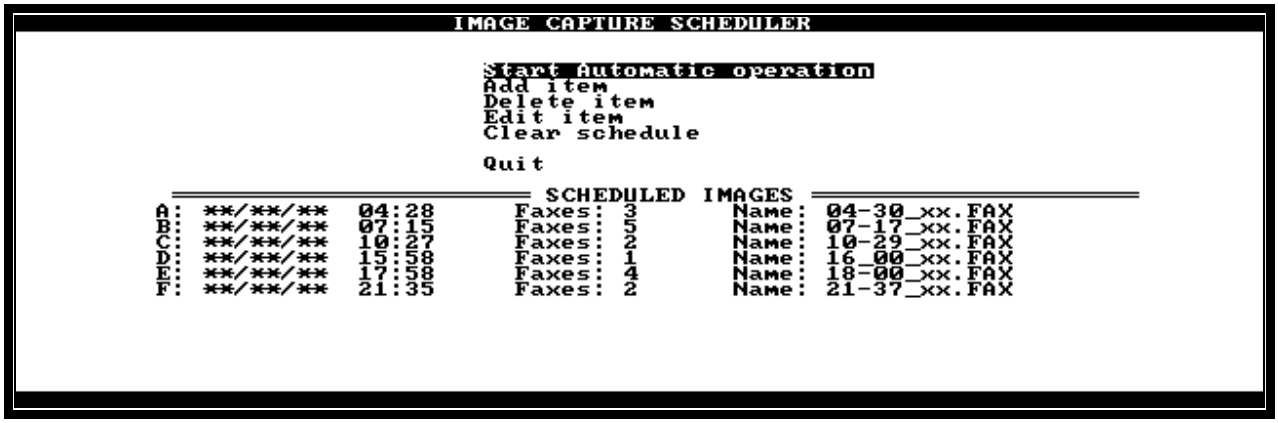
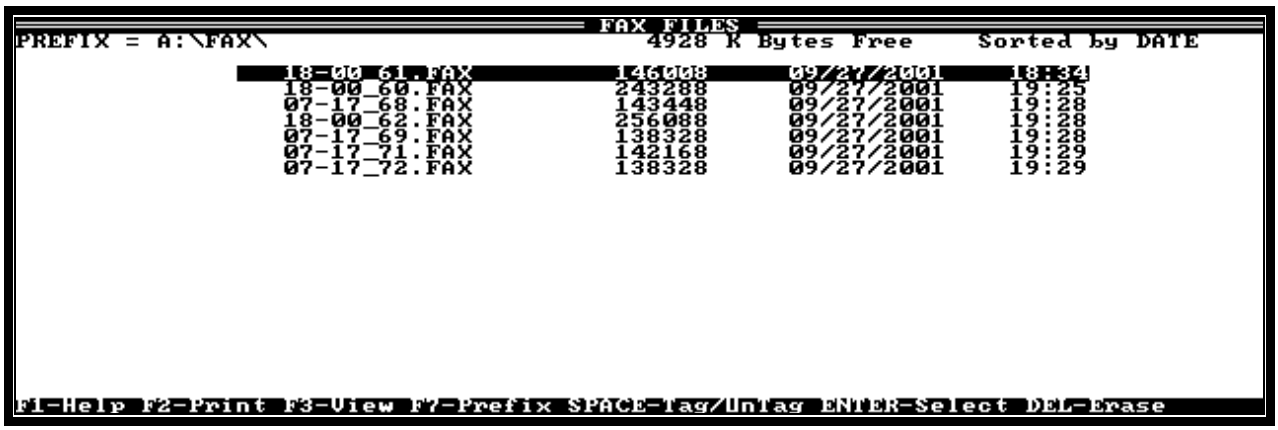


IMAGE CAPTURE SCHEDULER
Start Automatic operation
Add item
Delete item
Edit item
Clear schedule
Quit
SCHEDULED IMAGES
A: **/**/** 04:28 Faxes: 3 Name: 04-30_xx.FAX
B: **/**/** 07:15 Faxes: 5 Name: 07-17_xx.FAX
C: **/**/** 10:27 Faxes: 2 Name: 10-29_xx.FAX
D: **/**/** 15:58 Faxes: 1 Name: 16_00_xx.FAX
E: **/**/** 17:58 Faxes: 4 Name: 18-00_xx.FAX
F: **/**/** 21:35 Faxes: 2 Name: 21-37_xx.FAX

The Autostart menu in HFFAX. Here it is programmed to receive three faxes from 04:28 onwards, five from 07:15, two from 10:27, one at 15:58, four from 17:58 and two from 21:35. All schedules are daily.

After the software has received a number of faxes in automatic reception, you can go to the File Manager menu and view the saved faxes. When you view a fax, you can use the arrow keys, page up and page down to position the fax on screen and Ctrl+f2 to save the fax to disk as a .GIF file. Press <esc> to return to the File Manager. If you press "W" immediately after returning to the file manager, the fax will be saved with the position on screen that you have adjusted it to.



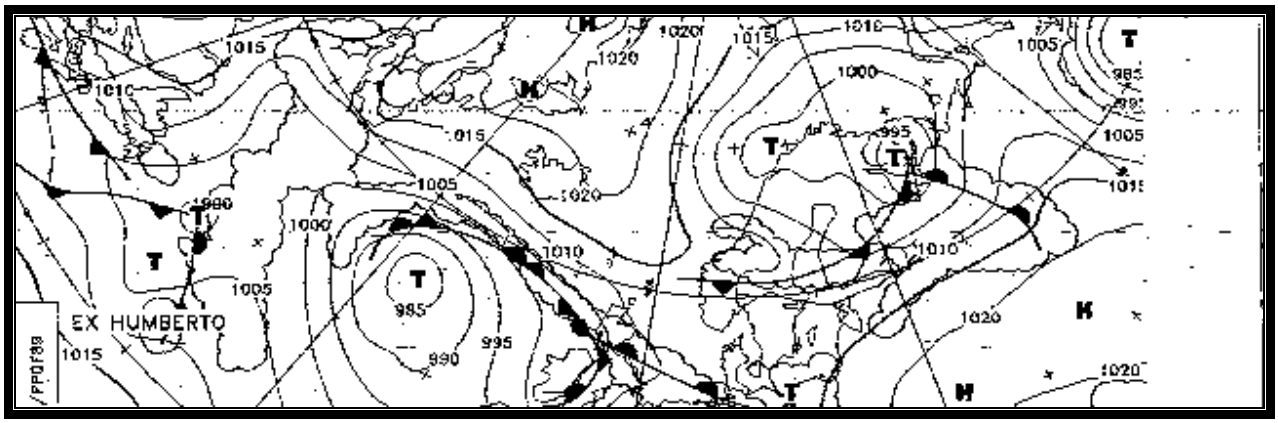
The File Manager menu in HFFAX 5.1a

FAX FILES
PREFIX = A:\FAX\
4928 K Bytes Free
Sorted by DATE
18 01 18:34
18 01 19:25
07 01 19:28
18 01 19:28
07 01 19:28
07 01 19:29
07 01 19:29
File Management Functions
F1 - Help - Display this screen
F2 - Print Tagged Images
F3 - View/Edit Tagged Images
F4 - Frame Loop Tagged File Views
F5 - Zoom all Tagged Images
F6 - Frame Looped Tagged File Zooms
F7 - Change File Prefix
F8 - Re-Sort Files
F9 - Tag all Files
F10- UnTag all File
ENTER - Load and View Selected File
Z - Load and Zoom Selected file
W - Update current file to disk
C - Color Press Image
R - Rename Selected File
DEL- Delete File or Files
↑↓→← PgUp PgDn - Select File
SPACE - Toggle File Tag
ESC - return to main menu
Press any key to continue
F1-Help F2-Print F3-View F7-Prefix SPACE-Tag/UnTag ENTER-Select DEL-Erase

The help menu on the File Manager screen

SLIDE-SHOW OF FORECASTS

If you have received several forecasts of the same area, you can view them as a slide show. First view each fax separately, adjust its position on screen and save as indicated above. While cruising in northern Norway, I have found it useful to move the 30, 48, 72 and 96 hour forecasts of Europe to the top left corner of the screen as indicated below. If you are in a different area, you will probably find another position works better. What is important is that it should be easy to repeat so that the images in the slide show overlap exactly.



A weatherfax adjusted to the top and left of HP200LX screen to prepare for a slideshow.

When all the images you want to view in the slide show have been adjusted and saved, mark each one by moving the cursor to the appropriate line and pressing the space bar. Then press f4 (function key four on the keyboard), chose A: as your scratch drive and answer yes to "Wait for key between images". HFFAX will draw each image on screen. Don't touch the keyboard while it is doing this, as this will abort the operation and return you to the file menu. Once HFFAX has finished loading all the images, it will display the first one and you can use the spacebar to step through the slide show.

SAVING SOME POWER

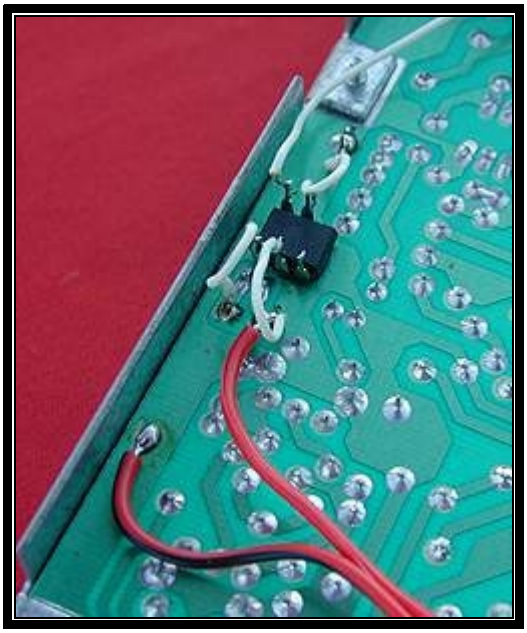
The combination of HP200LX palmtop, NASA Target receiver and NASA active HF antenna draws around 160 mA. This works out at just under 4 Ah per day, and if you're happy to live with this, all you need to do is set the schedule in HFFAX, switch the receiver on and leave your hardware to get on with the job. However, with a combination of a little batch file trickery and one cheap electronic component, you can reduce the power consumption to less than half. For this to work, you must have a receiver which will return to the last frequency you were listening to or preferably a programmed frequency every time it is powered up.

This is where it gets a bit more complicated. I found that when HFFAX is waiting for faxes, pin 8 on the RS-232 goes to +6V. This pin can power a circuit up to 10 - 12 mA, and I've connected it to an optocoupler (PLA140 by CP Clare) that switches the power to the radio. I have installed the optocoupler inside the receiver independent of the power switch so that the receiver can be switched on and used to listen to short-wave radio when it is not busy receiving weatherfaxes. As long as I don't touch the clarify button and remember to switch the receiver off when I am finished listening, it returns to the correct frequency for weatherfax reception when it is automatically switched on at the next schedule in HFFAX.

If you don't want to perform surgery on your short-wave receiver, you could also connect the optocoupler externally with a bypass switch for those times when you want to listen to the radio. If you do this, you will have to leave the receiver's on/off switch in the **on** position (with the volume turned down) while automatically receiving weatherfaxes.

The PLA140 optocoupler cannot provide more than 200 mA, so if your receiver draws more than this or you are using a transceiver where there's a risk that someone might accidentally key the transmitter, you should use the optocoupler to power the receiver via a relay.

I have installed a 9 pin male D connector on the back of the short-wave receiver to connect the palmtop to the receiver. The thin white wire goes to the optocoupler. Note that a desktop or notebook computer would need a female connector wired differently.



The optocoupler installed inside the NASA Target short-wave receiver. It has simply been superglued feet up to the circuit board. The thin white wire goes to pin 8 on the 9 pin D connector. The red wires go to the outside of the receiver to provide power to the NASA active short-wave antenna only while the receiver is on.

Through some good old-fashioned DOS batch file trickery, I've got the computer starting the HFFAX software in auto receive mode and switching the short-wave receiver on at scheduled times and then switching the receiver off again when the faxes have come through. The most important tool used to achieve this is the Freeware DOS utility ScanCode. ScanCode is run from a batch file before HFFAX is started and sends keystrokes to the application just as if they had been typed on the keyboard. It can also send keystrokes after a set delay or at a specified time.

SAMPLE BATCH FILES

The screen shot under "AUTOMATIC RECEPTION" shows the schedules used in this example. If you are listening to a different weatherfax transmitter or have different preferences as to what you wish to receive, you will have to alter the times accordingly.
As previously mentioned, when HFFAX reaches a scheduled time in auto receive mode, pin 8 on the RS-232 port goes to +6V. I use this to switch the short-wave receiver on via an optocoupler. Unfortunately, pin 8 is not switched off again when the scheduled faxes have been received. The easiest way of resetting it seems to be to reset the computer. The following batch files start the HFFAX software in auto receive mode, wait until the scheduled faxes have been received and then close HFFAX and reset the computer. When the computer is reset, it automatically restarts HFFAX in auto receive mode. Pin 8 on the RS-232 and thus the short-wave receiver is then powered up again at the next scheduled time in HFFAX.
In addition to HFFAX 5.1a, I use the Freeware utilities LXSTAT.COM which allows me to change some of the hardware settings in the computer and SCANCODE.COM which allows me to send "fake" keystrokes to HFFAX.
A ZIP file containing LxStat, ScanCode and my sample batch files can be downloaded from http://home.no.net/naomij/files/faxstuff.zip.
This section assumes some basic knowledge of MS-DOS. When it is booted, an MS-DOS computer always looks for an AUTOEXEC.BAT file. If it finds one, it executes the commands it finds in that file. The following are the batch files I use on the HPLX. Lines beginning with REM: are comments and can be omitted.

A:\AUTOEXEC.BAT

```
@echo off
prompt $p$g

path a:\;c:\;d:\;d:\bin;d:\dos;a:\bats;a:\util;a:\nc;
   REM: This line tells DOS where to look for the utilities we use.
   REM: It saves specifying the full path every time we need
   REM: a utility. The batch files are in a:\bats.
   REM: ScanCode and LxStat are in a:\util

set scancode=m3
   REM: This sets the default mode for ScanCode to mode 3 as this
   REM: is the only mode that works on the HPLX. This saves having
   REM: to specify the mode every time ScanCode is used.

lxstat n c d t03:00
   REM: Sets battery type in the HP to NiCd, disables the charging
   REM: system and sets the switch off timer to three minutes.
   REM: I use NiCd batteries in my LX. If you use alkalines,
   REM: replace "n" in this line with "a".

scancode d15 "hffax" enter
   REM: Sets ScanCode to wait 15 seconds, then types "hffax" and
   REM: presses ENTER. The 15 second delay gives the user a chance
   REM: to suspend automatic weatherfax reception if he wants to
   REM: do some work in DOS.

cls
   REM: Clear the screen.

type a:\bats\a.mnu
   REM: Display the menu file "A.MNU" on screen
```

The following is the A.MNU menu file:

A:\BATS\A.MNU

```
**************************************************************************
*                                                                        *
*   Type S <enter> within 15 seconds to suspend automatic operation.     *
*                                                                        *
**************************************************************************
```

Typing S and hitting the Enter key at the above prompt executes the following batch file which clears the pending keystrokes from ScanCode and tells you how to restart automatic operation when you have finished whatever you wanted to do in DOS.

A:\BATS\S.BAT

```
@echo off

scancode u
   REM: Clear pending keystrokes from ScanCode.

cls
   REM: Clear the screen

Type a:\bats\s.mnu
   REM: Display the "S.MNU" menu file on screen
```

The following is the S.MNU menu file:

A:\BATS\S.MNU

```
**************************************************************************
*                                                                        *
*              Type A <enter> to resume automatic operation.             *
*                                                                        *
**************************************************************************
```

Typing A and hitting the Enter key at the above prompt executes the following batch file which restarts the computer.

A:\BATS\A.BAT

```
scancode reboot
   REM: This line does the same as hitting Ctrl+Alt+Del
   REM: on the keyboard.
```

Running the above batch file restarts the computer, which in turn will execute the AUTOEXEC.BAT file. If the computer is not disturbed in the 15 seconds before ScanCode types "hffax" followed by <enter>, the following batch file will be executed. This is where all the complicated stuff happens, so hold on to your hat!

A:\BATS\HFFAX.BAT

```
@echo off

cls
   REM: Clear the screen

lxstat v 0 t 0
   REM: Turn off sound and make sure the computer doesn't
   REM: time-out and power down while HFFAX is running.

a:
cd\hffax51a
   REM: Go to disk a: and change to the \hffax51a directory
   REM: where the HFFAX software is.

   REM: The following lines load ScanCode with the keystrokes to
   REM: be executed while HFFAX is running. ScanCode sits quietly
   REM: in the background until the programmed time, then sends
   REM: the keystrokes as if they had been typed on the keyboard.

scancode c05:50 esc esc d30 esc esc d30 "q" "q"
   REM: Quit HFFAX after the 04:28 schedule is finished.
   REM: This command waits in the background while HFFAX
   REM: is running. At 05:50, it sends ESC twice, then
   REM: waits 30 seconds, sends ESC twice again, waits
   REM: another 30 seconds and types "q" twice.

scancode c08:38 esc esc d30 esc esc d30 "q" "q"
   REM: Quit HFFAX after the five faxes of the 07:15 schedule
   REM: are finished.

scancode c11:20 esc esc d30 esc esc d30 "q" "q"

scancode c16:31 esc esc d30 esc esc d30 "q" "q"

scancode c19:24 esc esc d30 esc esc d30 "q" "q"

scancode c22:30 esc esc d30 esc esc d30 "q" "q"

scancode d3 "a" d1 "s"
   REM: Sends the keystrokes to set HFFAX to auto receive mode
   REM: This is the last ScanCode command that is loaded before
   REM: HFFAX is started. It waits a couple of seconds till HFFAX
   REM: is up and running, then types "a" to get HFFAX to the
   REM: autostart menu, waits one second for the menu to open
   REM: and then types "s" to start automatic reception.

hffax
   REM: This line starts the HFFAX software

lxstat v 2 t03:00
   REM: This line is executed after HFFAX has closed and
   REM: turns the sound on the Palmtop back on and sets the
   REM: shutdown timer to three minutes.

scancode reboot
   REM: This line does the same as hitting Ctrl+Alt+Del
   REM: on the keyboard.
```

The magic happens in the line that reads:

```
scancode c05:50 esc esc d30 esc esc d30 "q" "q"
```

On my HPLX, the first schedule of the day in HFFAX is configured to start listening at 04:28 and grab the next three faxes that come along. The first is transmitted at 04:30 and the last of the three is finished at 05:40. The above line stops the HFFAX software at 05:50 after the last of the three faxes has been received. When HFFAX is closed, the execution of the batch file will continue and the computer will be reset. This resets the RS-232 port, switching off the short-wave receiver. Resetting the computer will execute the AUTOEXEC.BAT file, which in turn executes the HFFAX.BAT file (after a 15 second delay) and gets HFFAX back into auto receive mode. If you are using several schedules per day, you need one line like the above with a different time for each schedule.

I have found that I sometimes need to be persistent to get through to HFFAX with "fake" keystrokes. This is why there are more keystrokes than would seem strictly necessary.

To be able to keep things simple and use only one batch file, I have included lines to stop HFFAX for all the scheduled times. This also has another benefit. If radio propagation was not good enough to receive the scheduled faxes, HFFAX will keep listening until it has received the number of faxes it has been asked to. While the software is actively listening, ScanCode is powerless to get through to it. By including all the times for ScanCode in the one batch file, there is a fair chance that if faxes are missed, the requested number of faxes will have been received by the end of the next schedule when ScanCode will close HFFAX, reboot the computer and thus switch off the receiver.

When HFFAX is in auto receive mode, the screen reads "Press any key to abort". The reason I use <esc> as opposed to any other key is to ensure that HFFAX is restarted in auto receive mode even if the user has inadvertently left it viewing a fax or one of the sub-menus. Thus, one should only miss one schedule if this happens.

TROUBLESHOOTING

A bug in HFFAX

HFFAX 5.1a has a small bug which you should be aware of. If radio propagation is really bad or if there is a lot of electronic noise, it sometimes gets stuck on a blank screen while attempting to receive a fax. When this happens, it will not respond to the "fake" keystrokes from ScanCode. It therefore pays to keep an eye on things. If you notice the short-wave receiver is on at a time when HFFAX should not normally be actively listening for faxes, have a look at your screen. If it is blank, hit <esc> and wait until the software is finished saving to file, then quit HFFAX manually and let the batch files restart it. When HFFAX has been stuck like this, the file it saves is always 88 bytes. For me, the biggest hurdles to successful weatherfax reception have been:

1. Electronic noise from my surroundings

I've mostly messed with this in winter while I was living aboard the boat in the middle of a town. At least in Norway, the weatherfax signals are often too weak to overcome the electronic noise in a town.

2. Wrong time of day

I mostly have time to play with computers etc. in the evenings. Once I got HFFAX working with automatic reception on the HP200LX, I have found out that reception is often better around 07:00 to 11:00 in my area, at least in winter.

3. Electronic noise from the computer

Before I got the HP200LX I was using a Toshiba 220CDS which generates a lot of electronic noise. I still have no luck receiving weatherfaxes with the Toshiba.

4. Other local sources of electronic interference

My 15A Guest™ shore power battery charger generates a lot of electronic noise. I've experimented a lot with clip on ferrites etc. to try to suppress it, but in the end I capitulated and I've simply connected it through a cheap digital timer which switches the charger off and on at the start and end of scheduled weatherfax times. It's still on for almost 17 hours a day, which is enough to keep the ship's batteries topped up and power the fridge, TV etc. Of course, the battery charger is not in use at sea, but weatherfaxes are just as important when planning a passage as they are when you're actually out on the ocean.

WHY USE A HP200LX PALMTOP FOR WEATHERFAX

I have four reasons for using a HP200LX for weatherfax reception rather than a Windows or Mac notebook:

1. Power consumption

At present, I receive a total of 17 weatherfaxes each day. Some are repeats which I've programmed the computer to receive in case reception wasn't very good the first time around. Even if it were possible to make my Toshiba Notebook switch itself on and off automatically, this would mean that the computer has to be on at least seven hours a day (not including the time I take to review the information received).
The only way of using and charging the Toshiba on the boat is via my 12V DC to 220V AC inverter. The inverter draws close to 5A when powering the Toshiba. Seven hours at 5A is 35 Ah, and it would take more than one hour each day of running my engine, two or three hours with the generator and shore power charger or 11 hours of direct sun on my 45W solar panel just to power the weatherfax reception. This is clearly not an acceptable option.
I would be able to reduce the power consumption a little by switching the computer on and off manually in time for the different faxes and monitoring the reception, but frankly, I have better things to do when I am cruising. Another option would be to make do with fewer faxes per day, but I don't see much point in using more expensive equipment to get a lesser result.
In contrast, my HP200LX draws 40 mA while actively listening for weatherfaxes and less in the pauses between the schedules. This gives a total consumption of well under 1 Ah per day. If I add the 96 mA power consumption of my short-wave receiver and 20 mA of the active antenna, both of which are only on while actually receiving, I'm still well under 2 Ah per day for 7 hours of reception.

2. A dedicated computer

I find it is far preferable to have a dedicated computer for daily weatherfax reception. If you need to use your computer for anything other than weatherfax reception at the time the faxes are coming through, all you can do is sit around and wait for it to finish, or chose to do without the weatherfaxes. The only viable alternative would be to use one of the new software packages for Windows which can run in the background, but this would mean using a relatively modern and thus expensive and power-hungry computer.

3. Electronic interference

My Toshiba generates so much electronic interference that the quality of the weatherfax signal is seriously compromised. The 12V DC to 220V AC inverter which I use to power it generates even more RFI, and the net result is that the Toshiba is useless for weatherfax reception.

4. Price

An Hewlett Packard 200LX palmtop computer combined with a low cost short-wave receiver is probably the cheapest weatherfax receiver money can buy. The 200LX is no longer made, but can usually be picked up for around UKP 100 at online auction sites on the Internet.

FURTHER READING

There is a useful manual for interpreting weatherfax images at:
http://www.mpc.ncep.noaa.gov/UGbegin.html

I would also like to recommend the "Mariner's Weather Handbook" by Steve & Linda Dashew. (ISBN 09658028-2-5) It is available online at:
http://www.setsail.com

The "Worldwide Radiofacsimile Webpage" is at:
http://www.HFFAX.de

The HPLX-L mailing list have a subscription page at:
http://www.sp.uconn.edu/~mchem1/HPLX.shtml

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